TOPIC 07-4 – Miscallenous, various

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0474

Sub-cellular localization of β-adrenergic receptors in rat ventricular myocytes

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In cardiac myocytes, β-adrenergic stimulation is mainly due to β1- and β2-receptors (ARs). In ventricular cardiac myocytes, the sub-cellular distribution of specific β-ARs is unclear: immunocytochemistry data and cAMP recording showed different results (between t-tubules (TT) and surface sarcolemma (SS)). Therefore, the functional distribution of β-ARs in ventricular cardiac myocytes (TT vs SS) is still unclear. This study addresses this point. Rat ventricular cells were enzymatically isolated. Detubulation was achieved using osmotic shock as previously described. Intracellular calcium concentration was recorded using fluorescent dye (fura-2 AM) and cell contraction was induced by field stimulation. Selective β1-adrenergic stimulation was achieved by perfusion of isoprenaline (0.1 μM) and ICI 118,551 (0.1 μM). Selective β2-adrenergic stimulation was achieved by perfusion of salbutamol (10 μM) and atenolol (1 μM). In control cells, β1-adrenergic and β2-adrenergic stimulation caused a significant increase in peak calcium transient (peak CaTr; 237±43%, n=29 and 25±4%, n=41, respectively), evaluating full β-adrenergic stimulation (i.e. SS + TT). In detubulated cells, β-adrenergic stimulation had a greater effect on peak CaTr than in control cells (+288±80% for β1, n=17 and 83±9% for β2 n=20; evaluating β-adrenergic stimulation only from SS). From these values, we calculated that the% of increase of peak CaTr from the TT was ~128% during β1-adrenergic, and ~1% during β2-adrenergic. These data indicates that β1- pathway is functional in SS and TT in ventricular cardiac cells. In contrast, β2-adrenegic stimulation have a physiological effect on CaTr *via* the SS only. These results are in contradiction with the latest report about the localization of β-adrenergic receptors. However, our study focuses on the functional β-ARs response (i.e. CaTr) instead of the response to the increase of cAMP, which may account for the different conclusion.

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0099

Quantification of subjective ease to use data from over 4,000 cardiac pacing leads

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The functional efficiency of a cardiac lead in a cardiac pacemaker system depends on objective physical characteristics (shape, insulation, polarity, fixation…) and on the individual practitioner's perception of ease of use.

Method: This study concerns 4,028 Medtronic leads, representing a mix of 68% ventricular and 32% atrial. The leads were used among 988 VVI, 1536 DDD and 28 VDD pacemakers. The investigators measured the electric parameters: pacing threshold, sensing and impedance. Subjective ease of use perception data were quantified on a codified scale from 1 to 9 (poor to excellent) for a certain number of parameters such as introduction into the vein, passage through the venous network, glide, maneuverability inside the chambers, flexibility, localization in the final site and passage through the tricuspid valve (for the ventricular leads).

Other quantifiable data were collected, including radioscopy duration, number of stylets used and total time for the lead localization procedure.

Results: The total duration of lead implant procedures was shown to be less than 15 minutes in each cavity in approximately 88% of cases. Ventricular thresholds were stable (0.46 +/- 0.28Volt) as were atrial thresholds. Both atrial and ventricular sensing were stable at (3.7 +/- 2.2mV) and (12.6 +/- 5.0mV) respectively. Impedance stability was identical in both standard leads and high impedance leads within +400 ohms in high impedance leads.

Discussion: Statistically speaking, there is an inverse correlation ($P<0.05$) between the radioscopy time and the ease of use score for atrial and ventricular leads. This study concerns data gathered on over 4,000 leads, which is a significant high number. Since 1998 and the appearance of the polarity switch function, the tendency is to use bipolar leads as primary approach (atrial 96%, ventricular 81%, in this study) without compromising patients safety and security.

0413

Prognostic value of persistent vs. transient fragmented QRS on a 12-lead ECG in patients with acute myocardial infarction

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Objective: To investigate the determinants and the prognostic capacity of fragmented QRS on a 12-lead ECG in patients with acute myocardial infarction.

Patients and methods: Prospective cohort of 307 consecutive patients with AMI. Main outcomes measure: in-hospital adverse outcomes, thirty-day and one year mortality.

Results: 163 (53%) were found without fQRS (No fQRS group). 144 (47%) presented a fQRS on the first 36 hours 12-lead ECG, which was persistent in 107 patients (persistent fQRS group) and non persistent in 37 patients (non-persistent fQRS group). Despite similar demographic features, clinical presentation and reperfusion strategies, patients with a fragmented QRS (transient or persistent) were older, more likely hypertensive and less smoker were found among these groups. If in-hospital adverse outcomes were similar between groups, interestingly we found a trend towards a greater likelihood of ventricular arrhythmias in the group without a fragmented QRS when compared with other groups (12% vs. 5% vs. 4%, respectively, p=0.054). An all-cause death at 30 days was similar in the three populations. At one year's follow-up, 45 (14.6%) patients had died from all causes and 30 (9.7%) from cardiovascular cause. The Kaplan Meier analysis revealed that mortality was significantly higher in the fQRS group (persistent or not) than in the non-fQRS group (30 (20%) vs. 15(9.2%) respectively, p=0.007). By multivariate logistic regression analysis, age (p=0.008) and the presence of a family history of CAD (p=0.043) were independent predictors of fQRS occurrence. In multivariate analysis six variables were significant predictors of all-cause death at one year: age, DBP, glucose on admission, LVEF, treatment with beta-blockers at the acute phase and presence of a fQRS.

Conclusions: The fQRS is an independent predictor of 1 year all cause death after AMI, even after correction with age and LVEF, and It is associated with lower event-free survival.

0083

Location of myocardial infarction and presence of life-threatening ventricular arrhythmias in its acute phase differ in patients with early and late occurrence of a subsequent serious arrhythmic event

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Background: The risk of sudden cardiac death (SCD) is highest in the first months after myocardial infarction (MI). However, treatment with an implantable cardioverter-defibrillator (ICD) early after MI was not associated with a mortality benefit in randomized trials. A better prediction of SCD and serious ventricular tachyarrhythmias (ventricular fibrillation [VF] or tachycardia [VT]) is needed, particularly in the early post-infarction period. We tested the hypothesis that MI location and presence of sustained VF/VT during the acute phase of MI may relate to an early occurrence of a first serious arrhythmic event (FSAE) after MI.

Methods: This retrospective analysis includes all post-MI patients implanted with an ICD in a single centre between 2000 and 2007 with a known timing of FSAE (n=166; mean age 65±10 years; mean left ventricular ejection fraction 32±8%). FSAE was defined as aborted SCD, sustained VF/VT, syncope or first appropriate ICD intervention since the last MI. We compared the groups of patients with early (≤6 months, n=27) vs. late (>6 months, n=139) occurrence of FSAE after index MI.

Results: Location of suffered MI and presence of VF/VT during the acute MI differed significantly between the compared groups (see table).

	Early FSAE	Late FSAE	*P*
Anterior MI	18 (67%)	61 (44%)	***0,04***
Posterior MI	10 (37%)	89 (64%)	***0,01***
VF/VT at MI	8 (30%)	8 (6%)	***<0,01***

Conclusion: History of anterior MI and VF/VT occurrence during the acute phase of MI were associated with an early occurrence of FSAE (≤6 months after index MI) in our patient cohort. These observations could help to identify the patients at risk of life-threatening ventricular arrhythmias early after MI and better select candidates for early primary prophylactic ICD implantation. However, our findings have to be confirmed prospectively in larger population.

0365

Relathionship beteween late-gadolinium enhancement in cardiac-MRI and arrhythmias in acute viral myocarditis

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Objectives: The aims of the study are to evaluate in a population of patients with acute viral myocarditis the relationship between cardiac Magnetic Resonance Imaging (MRI) findings and arrhythmias and to identify MRI prognostic factors in this population.

Methods: We retrospectively studied a population of 30 consecutives patients diagnosed with acute viral myocarditis based on clinical and biological findings and confirmed with the presence of late-gadolinium enhancement of the myocardium. All those parameters were confronted using contingence tables and correlation studies in order to identify a potential relationship between the latter.

Results: 8/30 patients (26.7%) presented with ventricular arrhythmias (ventricular ectopies or ventricular tachycardia) which were significantly associated with a late gadolinium enhancement extension score >7 (6/30 patients, p=0.0451) and an ejection fraction under 50% (4/30 patients, p= 0.0117). 9/30 patients displayed an extensive myocardial involvement (> 2 segment/17) which was associated with atrial arrhythmias (2/30 patients, p=0.0127) and heart failure (4/30 patients, p=0.0163). Correlation study demonstrated a significant correlation between troponine levels and the segmental involvement score (r=0.5978, p=0.005) as well as the late gadolinium enhancement score (r=0.07052, p=0.7112). There was also a significant correlation between the segmental extension and the late gadolinium enhancement scores (r=0.0706, p=0.1573). ST modifications were frequent (66.7%) mostly ST-segment elevation (56.7%) but also ST-segment depression (23.3%). Although ECG displayed a good 62.5% sensitivity to localize the myocardial lesion, the specificity was poor (0%, p=0.0269).

Conclusion: In acute viral myocarditis, cardiac-MRI findings, in particular late-gadolinium enhancement, are associated with ventricular arrhythmias, and could therefore be of interest in the prognostic evaluation of those patients. Nevertheless, long-term prospective studies are needed to confirm this result.